

## CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1 1. A computer-based learning system for providing an  
2 interactive lesson between the computer and a student user  
3 comprising:

4 user input means including at least audio input means for  
5 delivering audible user responses to said system and speech  
6 recognition means associated with said audio input means;

7 user interface means including at least audio output  
8 means;

9 program controller means for generating said interactive  
10 lesson; and

11 a plurality of databases for access by said program  
12 controller means including at least one lesson database and at  
13 least one lesson-based speech interpretation database.

1 2. The system of Claim 1 wherein said at least one lesson-  
2 based speech interpretation database comprises at least one  
3 database of anticipated incorrect student responses.

1 3. The system of Claim 1 wherein said at least one lesson-  
2 based speech interpretation database comprises at least one

3 database comprising the set of all possible combinations of  
4 correct student responses.

1 4. The system of Claim 1 further comprising at least one  
2 database of acoustic information for use by said speech  
3 recognition means in interpreting student responses.

1 5. The system of Claim 4 wherein said database of acoustic  
2 information comprises acoustic information relating to speech  
3 by a specific class of students.

1 6. The system of Claim 1 further comprising visual output  
2 means for display of information accessed from said at least  
3 one lesson database by said program controller means.

1 7. A computer-based learning system for providing an  
2 interactive lesson between the computer and a student user  
3 comprising:

4 user input means including at least audio input means for  
5 delivering audible user responses to said system and speech  
6 recognition means associated with said audio input means;

7 user interface means including at least audio output  
8 means;

9 B program controller means for dynamically generating said interactive  
10 lesson; and

11 a plurality of databases for access by said program

12 controller means including at least one lesson database and at  
13 least one lesson storage database for storing the  
14 interactively generated lesson.

1 8. The system of Claim 7 wherein said system further  
2 comprises visual output means and wherein said program  
3 controller is adapted to display said interactively generated  
4 lesson stored in said at least one lesson storage database.

10 9. The system of Claim 7 further comprising network means  
2 for providing said interactively generated lesson stored in  
3 said at least one lesson ~~storage~~ database from said computer  
4 to a remote location.

10 10. A computer-based learning system for providing an  
2 interactive lesson between the computer and a student user  
3 comprising:

4 user input means including at least audio input means for  
5 delivering user speech to said system and speech recognition  
6 means associated with said audio input means;

7 user interface means including at least audio output  
8 means and visual output means;

9 program controller means for generating said interactive  
10 lesson;

11 a plurality of databases for access by said program  
12 controller means including at least one lesson database; and

13            wherein said program controller means additionally  
14 comprises means for providing a prompt to pace the student  
15 through said lesson and wherein said pace is determined by  
16 said executive program assessing said student speech.

1            11. The system of Claim 1 wherein said program controller is  
2 adapted to continually monitor student progress based on said  
3 student responses.

1            12. The system of Claim 11 wherein said program controller is  
2 further adapted to generate student progress information based  
3 on said monitoring; and further comprising at least one  
4 storage location for storing said student progress  
5 information.

1            13. The system of Claim 11 wherein said program controller is  
2 adapted to alter the level of interaction of the student with  
3 said lesson based upon said monitoring.

1            14. The system of Claim 11 wherein said program controller is  
2 additionally adapted to generate at least audio output based  
3 on said monitoring.

1            15. The system of Claim 13 wherein said program controller  
2 means additionally comprises means for providing a prompt to  
3 pace the student through said lesson and wherein said pace is

4 determined by said monitoring.

1 16. The system of Claim 7 wherein said program controller is  
2 adapted to continually monitor student progress based on said  
3 student responses.

1 17. The system of Claim 16 wherein said program controller is  
2 further adapted to generate student progress information based  
3 on said monitoring; and further comprising at least one  
4 storage location for storing said student progress  
5 information.

1 18. The system of Claim 16 wherein said program controller is  
2 adapted to alter the level of interaction of the student with  
3 said lesson based upon said monitoring.

1 19. The system of Claim 16 wherein said program controller is  
2 additionally adapted to generate at least audio output based  
3 on said monitoring.

1 20. The system of Claim 18 wherein said program controller  
2 means additionally comprises means for providing a prompt to  
3 pace the student through said lesson and wherein said pace is  
4 determined by said monitoring.

1 21. A computer-based learning system for providing an  
2 interactive lesson between the computer and a student user  
3 comprising:

4 *sub* user input means including at least audio input means for  
5 *B2* delivering audible user responses to said system and speech  
6 recognition means associated with said audio input means;

7 user interface means including at least audio output  
8 means;

9 program controller means for generating said interactive  
10 lesson; and

11 a plurality of databases for access by said program  
12 controller means including at least one lesson database, a  
13 plurality of lesson-based speech interpretation databases at  
14 least comprising one database of anticipated incorrect student  
15 responses and one database comprising the set of all possible  
16 combinations of correct student responses; and at least one  
17 database of acoustic information for use by said speech  
18 recognition means in interpreting student responses.

1 22. The system of Claim 21 further including at least one  
2 lesson storage database for storing the interactively  
3 generated lesson.

1 23. The system of Claim 21 wherein said program controller is  
2 adapted to continually monitor student progress based on said  
3 student responses, to generate student progress information

4 based on said monitoring; and to alter the level of  
5 interaction of the student with said lesson based upon said  
6 monitoring.

1 24. The system of Claim 23 wherein said program controller  
2 means additionally comprises means for providing a prompt to  
3 pace the student through said lesson and wherein said pace is  
4 determined by said monitoring.

1 25. A system for recognizing speaker utterances of known  
2 textual material comprising:

3 means for receiving audible input from said speaker;

4 at least one database for storing a plurality of versions  
5 of said known textual material;

6 speech recognition means for comparing said audible input  
7 to said plurality of versions and for generating an output  
8 based upon said comparing.

1 B 26. The system of Claim 25 wherein said <sup>plurality of</sup> ~~at least one~~ databases  
2 comprises at least one database of anticipated incorrect  
3 student responses.

1 27. The system of Claim 25 wherein said at least one database  
2 comprises at least one database comprising the set of all  
3 possible combinations of correct student responses.

1 28. The system of Claim 25 further comprising at least one  
2 database of acoustic information for use by said speech  
3 recognition means in interpreting student responses.

1 29. A system for providing effective speech recognition of  
2 user utterances of text comprising:

3 means for inputting text to said system;

4 means for generating a plurality of phoneme sequences  
5 based on said input text;

6 means for generating a plurality of variations of said  
7 input text; and

8 at least one storage means for storing said plurality of  
9 phoneme sequences and said plurality of variations of said  
10 input text.

1 30. The system of Claim 29 further comprising at least one  
2 database having acoustic interpretation information.

1 31. A method for providing an interactive language lesson  
2 between a student user and a computer having at least a  
3 program controller, speech recognition means, at least one  
4 first database for storing said lesson and at least one second  
5 database for storing lesson-based speech interpretation  
6 information, user input means for providing responses from  
7 said student user, and output means for providing information  
8 relating to said lesson to said user, comprising program



9 controller steps of:

10 retrieving lesson information from said at least one  
11 first database and lesson-based speech interpretation  
12 information corresponding to said lesson information from said  
13 at least one second database;

14 providing lesson information to said user at said output  
15 means;

16 providing lesson-based speech recognition information to  
17 said speech recognition means;

18 prompting said student user to provide responses at said  
19 user input means;

20 receiving student responses from said speech recognition  
21 means; and

22 generating an output based upon said student responses.

1 32. The method of Claim 31, wherein said computer has at  
2 least one additional database for storing student level  
3 information, further comprising the step of retrieving student  
4 level information from said at least one additional database;  
5 and adjusting said lesson information based upon said  
6 retrieval of student level information.

1 33. The method of Claim 31 further comprising said program  
2 controller continually monitoring student progress based on <sup>Said interpreting of</sup>  
3 said student responses.

1 34. The method of Claim 33 wherein said program controller is  
2 further adapted to generate student progress information based  
3 on said monitoring.

1 35. The method of Claim 33 further comprising said program  
2 controller altering the prompting of said student based upon  
3 said monitoring.

1 36. The method of Claim 33 further comprising said program  
2 controller generating at least audio output based on said  
3 monitoring.

1 37. The method of Claim 33 further comprising providing means  
2 to pace the student through said lesson, and altering said  
3 pace based upon said monitoring.

1 38. The method of Claim 31, wherein said computer further  
2 comprises at least one lesson storage database, further  
3 comprising the step of storing said interactive language  
4 lesson at said at least one lesson storage database.

1 B 39. The <sup>method</sup>~~system~~ of Claim 38 wherein said computer further  
2 comprises visual output means, further comprising the step of  
3 displaying said interactive language lesson stored in said at  
4 least one lesson storage database.

1 40. A method for speech recognition means to interpret  
2 student utterances of known text in a lesson comprising:

3 receiving student utterances;

4 accessing lesson-based speech interpretation information  
5 from one or more lesson-based database;

6 comparing said accessed information to said receiving  
7 utterances; and

8 generating an output based upon said comparing.

1 41. The method of Claim 40 further comprising the steps of  
2 accessing acoustic information from at least one acoustic  
3 database and comparing said acoustic information to said  
4 student utterances.

1 42. A method of providing effective speech recognition of  
2 user utterances of text comprising:

3 inputting text to said system;

4 generating a plurality of phoneme sequences based on said

5 input text;

6 generating a plurality of variations of said input text;

7 and

8 storing said plurality of phoneme sequences and said  
9 plurality of variations of said input text.

1 43. The method of Claim 42 further comprising providing at  
2 least one database having acoustic interpretation information.